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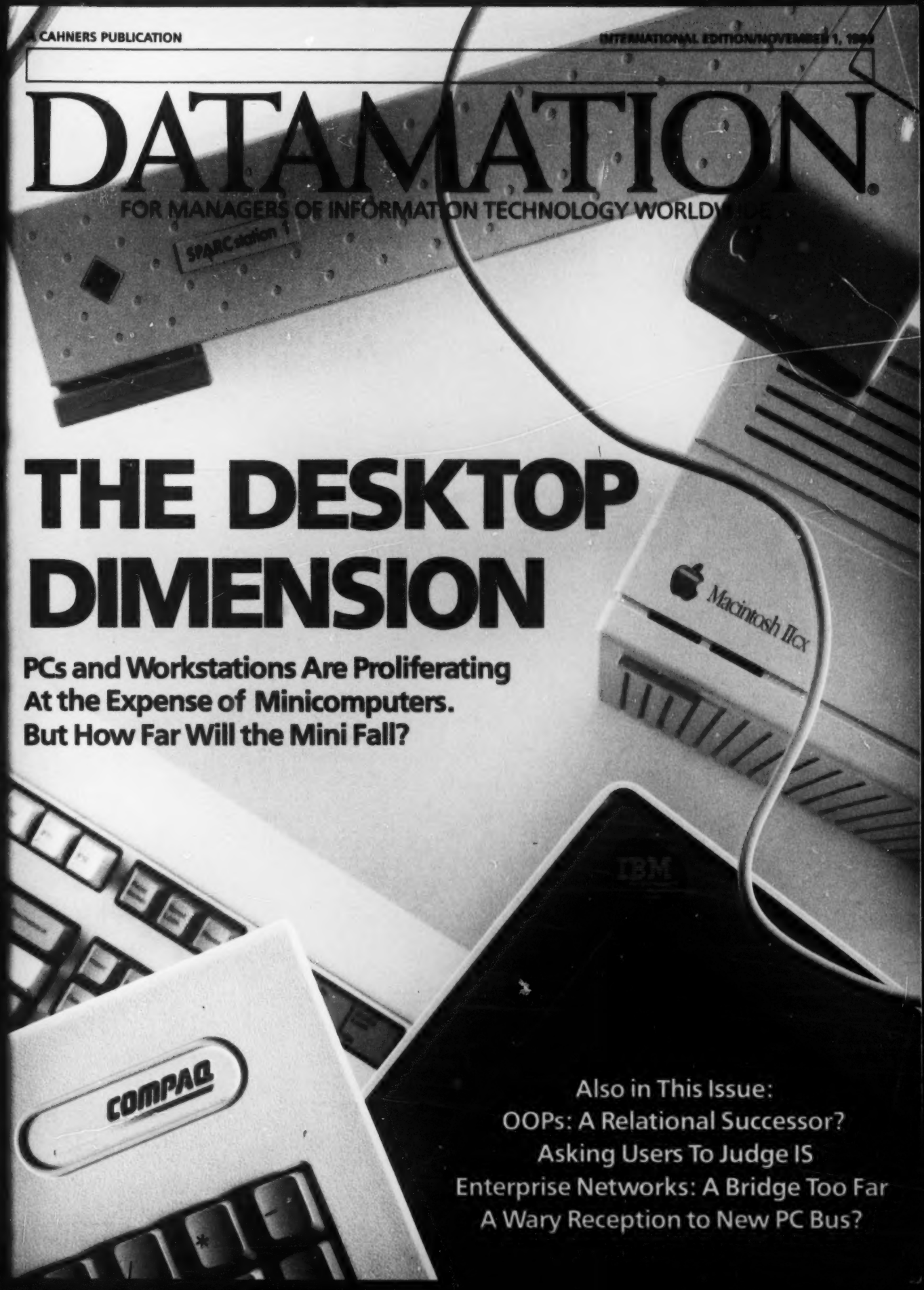
# DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE




# THE DESKTOP DIMENSION

**PCs and Workstations Are Proliferating At the Expense of Minicomputers. But How Far Will the Mini Fall?**

Also in This Issue:

OOPs: A Relational Successor?

Asking Users To Judge IS

Enterprise Networks: A Bridge Too Far

A Wary Reception to New PC Bus?

NOV. 1, 1989

# DATAMATION®

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

VOLUME 35
NUMBER 21

## The Desktop Dimension 28

BY BOB FRANCIS For the first time in the 16 years we've surveyed the spending plans of mini and microcomputer users, minicomputer spending is expected to drop. But, the PC industry is back in shape, the workstation world is exploding, networks are multiplying and UNIX is taking off.

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Cover Photography by David Bradley

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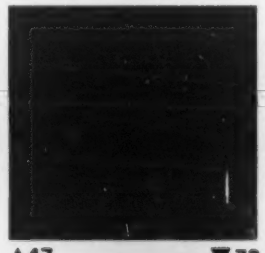

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BY PARKER HODGES Object-oriented technology seems to be going down a path that relational technology traveled some 10 years ago. With scholarly champions, start-up developers and some interest from major computer and software companies, object-oriented database management systems are making headway, especially in complex applications. Will these databases ever replace relational technology for IS applications?

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**INTERNATIONAL**


Special supplement, not included in all issues. 102-1

# The Expanding Universe of Computing

Perhaps the most fascinating aspect of this issue's cover story, "The Desktop Dimension," in which we survey users of mini and microcomputers, is its hard evidence for growth in the market for personal computers and workstations. This may sound almost trite given the well-known and more-often-than-not phenomenal expansion of this market in recent years. But what isn't so obvious is the larger picture this current growth trend may suggest.

More people are doing more things with more computing power than ever before. Contrary to those who have been predicting consolidation and maturity in the computer industry, the data from the latest DATAMATION/Cowen & Co. survey suggest an expanding universe of computing; one not necessarily defined by machine type; and one, as a whole, that is only just beginning to develop.

"The conclusion that PCs and workstations have spread beyond the space they formally occupied in the IS strategies of many user organizations . . . is inescapable," writes Bob Francis, DATAMATION's Dallas bureau manager and PC writer. PC shipments are expected to rise 11.3% between July 1989 and June 1990, while workstations are expected to climb a whopping 27.3%. Both are seen as cutting into anticipated shipments of minicomputers, which are expected to fall 10.5% during the same period. Yet, the growth rates in PCs and workstations could be the envy of many other industries.

Photograph by Dave Bradley

**FRANCIS:** The influence of the PC is spreading throughout corporations.

Even though the increased expectations for PCs and workstations may be taking a bite, albeit a temporary one, out of intended minicomputer purchases, the growth in these systems is strong enough to show that computing itself is spreading within corporations. And this expansion is occurring without any major breakthroughs in applications software or significant changes in the way these machines are being used. Just imagine what the growth might be if, or when, these two factors experience positive change.

So, the new DATAMATION/Cowen & Co. survey has an underlying message of significance beyond the numbers: the industry's glass is truly only half full.

### Micro Channel versus EISA and the Service Quotient

Our continuing focus on PC market analysis extends to two other stories by Francis in this issue. In "A Wary Reception to PC Bus Debut?," Francis reports that few technical differences separate the IBM PS/2 Micro Channel bus architecture from that of the alternative Extended Industry Standard Architecture (EISA) bus due soon from Compaq Computer Corp. and others. Still, he finds, users are choosing Micro Channel for reasons unrelated to the bus' technical merits: the availability of add-on boards and peripherals support.

And in "New Demands on PC Support," Francis and John McMullen— DATAMATION's new associate editor specializing in PC software—reveal that many corporations are adopting new PC service and support strategies. Flush with thousands of PCs in some cases, many companies no longer want to directly handle service and support for their PCs. But in going to an outside supplier for such services, IS managers are finding that they have to manage a new and often complex relationship.

*David R. Brousell, Executive Editor*

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# THE DESKTOP DIMENSION

The PC industry is back in shape. The workstation world is exploding. Networks are multiplying. And UNIX is taking off. All are propelling desktop systems into the realm of minicomputers.

BY BOB FRANCIS

Desktop computing has entered a new dimension in the offices, plants and factories of U.S. users. Powered by high-performance computer chips, smartened by standard operating systems, tooled with sufficient application software and networked in large numbers, desktop systems in the form of high-end personal computers and full-range workstations are taking over enterprises formerly dedicated to building their IS infrastructures on minicomputer platforms.

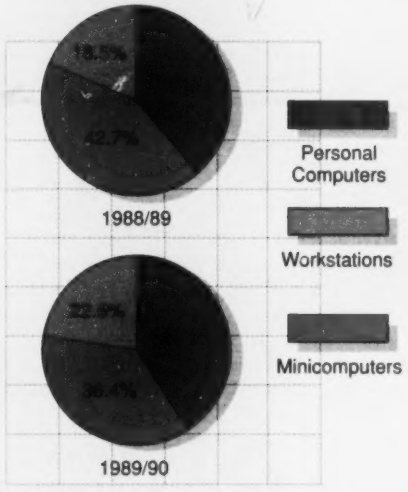
The conclusion is inescapable that PCs and workstations are being thought by IS strategists as much more than glorified typewriters, gee-whiz calculators and electronic sketch boards—at the expense of minicomputers. For the first time in the 16-year history of our annual survey measuring U.S. users' intentions to buy micro and minicomputers, purchases of minis are expected to decline. At the same time, investments in PCs, workstations and other key elements of distributed computing—networks and databases, for example—are on their way up.

Just how far down and high up will different market segments go? Survey results indicate that the dollar value of minicomputer shipments will fall 10.5% between July 1989 and June 1990. Monies spent on workstations will climb 27.3%. The dollar value of PC shipments is expected to rise 11.3%. Networks linking minicomputers and workstations are set to jump 28%; those tying PCs are slated to rise a stunning 44%. Applications for minicomputers and workstations also are on the ascent, as the survey results point to a 19% jump in the dollars spent on database software and a 13% rise in on-line transaction processing (OLTP) systems purchases.

## The Undeniable Dominance of Desktop Systems

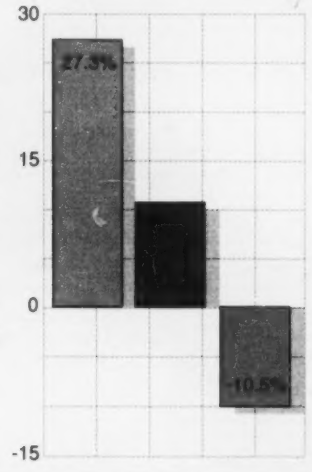
Users will spend more on PCs than on minicomputers...

**% OF NEW SYSTEMS PURCHASES (IN DOLLARS)**




Propelling PCs and workstations to double-digit growth.

**PROJECTED SHIPMENT GROWTH TO U.S. CUSTOMERS (IN DOLLARS)**




Source: DATAMATION/Cowen & Co.

**High-end PCs and workstations are taking a rising share of the IS dollar.**

This year's survey, based on the answers to questionnaires sent to 65,000 DATAMATION subscribers in the United States, was conducted by Cowen & Co. during late summer. The Boston-based financial securities firm, which specializes in high-technology and biotechnology companies, has performed the Mini/Micro survey annually since 1973. This year's sample of user responses, as in years past, drew from a cross section of U.S.-based users by industry (including government) and geography.

Although DATAMATION readers making up this survey do not necessarily constitute a scientific sampling of the U.S. user community, survey results are true indicators of the directions IS managers

should be leading their organizations. Managers of enterprises that are multinational or foreign in nature, however, should bear in mind that the sample does not measure trends outside the United States.

### What the World Is Coming To

The responses from the 4,700 users that participated in this year's poll reveal a number of far-reaching trends likely to shape the course of the U.S. computer industry—and perhaps the world stage—in 1990 and beyond. Chief among them are:

- A dramatic improvement in the health of the U.S. PC market.
- A significant growth in networks and networked-based applications.
- Wide use of multiple—not single—PC suppliers for any single user organization and increased pressure on PC prices.
- An allegiance to existing PC standards, with MS/DOS holding its ground against OS/2.
- A continued dearth of any breakthroughs in application software—save, perhaps, in the area of database management—that would propel the industry upward at the clip that Lotus Development Corp.'s Lotus 1-2-3 accelerated the PC industry in its early days.
- A rapid consolidation within the ranks of workstation and minicomputer suppliers.
- Big gains for UNIX and reduced instruction set computing (RISC), the processor architecture most closely associated with its use.

The survey also reveals changes in the attitude users are displaying toward their suppliers of PCs, workstations and minicomputers. Of the top three U.S.-based suppliers of all such systems, IBM fares best on the survey—reversing some downward spirals seen on past surveys. Digital Equipment Corp. loses ground—due to the absence of a high-end product in its minicomputer product mix and the newness of its PC and RISC product lines. Unisys Corp. shows slippage nearly across the board—despite being on the right side of UNIX.

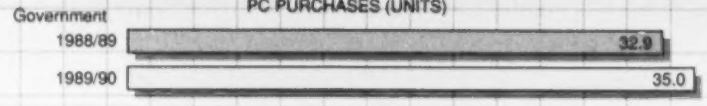
Here is how some other key suppliers fare:

- Compaq Computer Corp., while holding on to its position as the No. 2 PC supplier (after IBM), faces challenges on pricing, product positioning and distribution fronts.
- Apple Computer Inc. continues to get high grades among PC users for ease of use, but its influence in PC networks is waning.
- Sun Microsystems Inc., despite its inability to predict quarter-to-quarter financial performance, exhibits strength in offering customers the features that many believe factor most in future system-purchasing decisions: standards (UNIX), networking and performance.

## What's Happening in Personal Computers

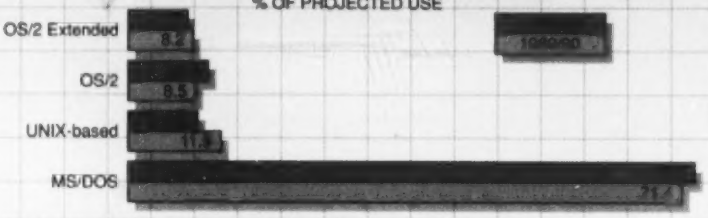
**The world's largest computer customer is increasing its PC investments...**

PC PURCHASES (UNITS)



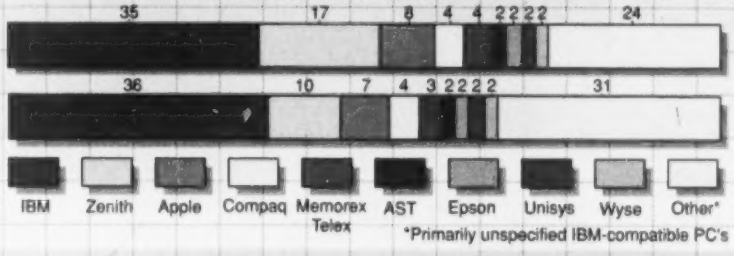

**Unix is gaining ground on OS/2, though MS/DOS dominates both...**

% OF PROJECTED USE



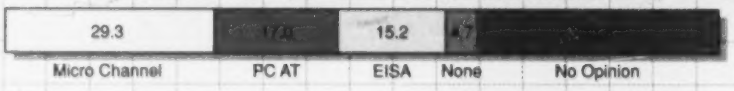

**Industry consolidation is a myth–users have more not fewer suppliers. And IBM may be regaining lost ground...**

% OF INDICATED UNIT PURCHASES



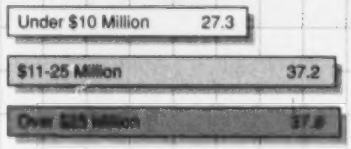

**The bus architecture battle is still raging...**

LEADING BUS ARCHITECTURE IN THE LONG RUN (BY % OF MENTIONS)



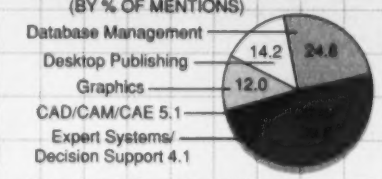

**Large organizations remain the best target for PC suppliers...**

% OF USERS NOT YET EQUIPPED WITH A PC



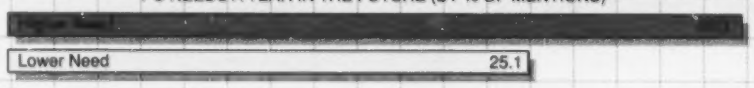

**Database management and publishing/graphics software may be keys to future growth...**

HIGHEST GROWTH POTENTIAL (BY % OF MENTIONS)




**And users have a greater need for PCs in the future**

PC NEEDS A YEAR IN THE FUTURE (BY % OF MENTIONS)



■ Hewlett-Packard Co. shows some surprising agility—dodging IBM's AS/400 bullet, flexing its peripherals muscle and capturing a fair share of its customers' PC business. But its workstation line (both homegrown and acquired) lacks the kind of muscle expected of the world's No. 1 supplier of such systems.

### PCs Regain Their Strength

The U.S. PC market is beginning to flex the sort of muscle it showed before last year's weak spell. The recovery no doubt is due to the 32-bit semiconductors coming from the likes of Intel Corp. and Motorola Inc., which are powering today's high-performance PCs. In last year's survey, users indicated they would need 5% fewer PCs between July 1988 and June 1989 than they had bought in the previous year. But in this year's tally, they're saying they intend to buy 3% more PCs by mid-1990 than they bought by mid-1989, which translates into 11% growth in dollars because of the h higher prices for today's PCs.

**IBM's AS/400 will dominate IBM minicomputer sales over the next 12 months.**

What accounts for the wild swing in PC purchases? Users were waiting for the right product to come along before they were willing to take desktop systems into a new dimension of corporate computing. That right product appears to be PCs based on Intel's 80386 32-bit chip. For example, demand for 80386 systems made by Compaq—one of the earliest PC makers to jump on the 32-bit bandwagon—jumps 10 to 1,400 units among users polled in this year's survey.

The 80386 chip also claims some responsibility for the phenomenal growth in workstations detected on this year's survey. Because the line between PCs and workstations is blurred, the survey counted those 80386-based systems priced above $7,500 as workstations. Those below that price were tallied as personal computers.

The wholesale rush to high-end PCs would seem to bode well for big time players like Compaq and IBM, but the survey results highlight another surprising trend: the rise of "others" as important PC suppliers. "Others," so christened by researchers because they lack enough market share to be identified by name, are grabbing greater and greater portions of users' PC unit purchases. "Others," like Dell Computer Corp., Everex Systems Inc., NEC Corp. and Packard Bell, to name a few, is expected to capture 31% of the PC purchases made by surveyed users between July 1989 and June 1990—up seven points from the 24% share they held during the last 12 months. The only brand name PC supplier that seems somewhat immune to the "others" invasion is IBM, whose market share actually may increase from 35 to 36% by next June.

The "others" phenomenon suggests two important changes in the way IS managers buy PCs. First, such managers may actually be seeking more—not fewer—PC suppliers. And two, they may be far more concerned with price than compatibility. Recent evidence, part anecdotal and part quantitative, points to such sweeping changes.

American Airlines Inc. recently ordered 50,000 PCs—not from a single supplier, but from a trio of them: AT&T, IBM and Tandy Corp. Although all of the PCs purchased by the airline during a two-year period will be based on 80386 technology, not all of them will feature the same bus architecture. Some will have the data highway scheme espoused by IBM known as Micro Channel Architecture (MCA). Others will be based on the traditional Advanced Technology (AT) bus—known in some circles as the Industry Standard Architecture (ISA). And some may b bear the extended version of that architecture, EISA.

### What PC Buyers Want

Price, the chief selling point for "other" PC suppliers, has emerged as the biggest single criterion used by IS managers in buying PCs in all but three cases. That's a far cry from as little as three years ago, when IBM-compatibility ranked as the major concern of PC purchasers. Then, 24% of users mentioned compatibility as an issue; today, barely 10% worry about it. Meanwhile, the price users pay for systems has skyrocketed in importance. More than 30% of users mention it as a major factor in making today's PC investments; just 20% listed it as such in 1986.

The PC suppliers that so far have managed to compete on the basis of something other than price are Apple, Compaq and HP. But there's no telling how long they will be able to rise above the price wars.

Although Apple's Macintosh system is built on proprietary technology primarily focused on ease of use, Apple's customers are still very price sensitive. In fact, buyers of Macintosh machines in our survey base their purchasing decisions on cost nearly as often as they base them on the Mac's superior graphics interface. This behavior among Apple buyers may explain why the Cupertino, Calif., computer maker is losing velocity in one market but is picking up speed in another. This year's survey shows Apple's share of PC units bought dropping from 8 to 7%, while the number of sites buying them is increasing from 7 to 8%.

For Compaq, a Texas tornado known to cloud some Big Blue skies in the past, this year's survey hints at a changing weather pattern. The Houston-based company built its success ($2 billion in annual revenues) and its profits ($255 million) on product reputation, not on prices; on PCs, not on other products; on retail distribution, not on direct sales. And those strategies probably will maintain Compaq's forceful presence in the corporate marketplace—supporting survey data that shows the company

holding onto its share of several PC market segments. But for how long?

Compaq will be hard pressed to sustain its momentum as users become more price sensitive and as "other" suppliers step up their attack of the high end of the PC market—Compaq's domain—with 80386-based PCs of their own. For the moment, Compaq seems to be banking more on its future EISA-based products than on anything else to maintain its strength. Company executives, in fact, seem to have ruled out the possibility of expanding Compaq's distribution channels beyond third parties like retailers—

## Important Criteria in Workstation Selection

1. System quality/reliability
2. Prior system compatibility
3. CPU performance
4. Vendor reputation/financial strength
5. Price/cost of ownership

even though the survey points to opportunities for PC suppliers that sell directly to customers like the U.S. government.

### Catching the Right PC Bus

EISA, the bus architecture that IBM-compatible PC makers are pushing, may or may not be a big hit among major PC users. Although no EISA-based products existed at the time users responded to this year's survey, enough publicity on the subject apparently had been generated to make an impression. Slightly more than 15% of surveyed users believe EISA will emerge as the dominant architecture for PCs, yet twice as many expect IBM's alternative, MCA, to be the data path that tops the bus schedule.

While the move to a wider bus architecture for 80386-based PCs seems to be under way, there doesn't seem to be any rush to a new operating system for those high-performance PCs. Support for OS/2, the operating system codeveloped by Microsoft Corp. and IBM for 80286-based and 80386-based machines, is weak at best. Enthusiasm for OS/2's predecessor, MS/DOS, remains high. Amazingly, users plan to use MS/DOS 71.4% of the time in the future. If any new PC operating system poses a threat to MS/DOS, it's UNIX. Between our 1988 and 1989 surveys, the number of users who expect to use UNIX for their PCs jumps from 8.9 to 11.9%, while those who have their sights set on OS/2 or OS/2 Extended Edition drops from 18.1 to 16.7%.

Do these results bode ill for MS/DOS and OS/2 creator Microsoft? Well, yes and no. Yes, in that it means OS/2 may not be raining down buckets of revenue on the Redmond, Wash.-based company anytime soon. No, for two reasons: MS/DOS royalties keep the company well in the system software chips, and the success of Microsoft's applications software ensures growth. Microsoft's Excel and Multiplan applications, for example, garner nearly twice as large a share of the PC spreadsheet market in this year's

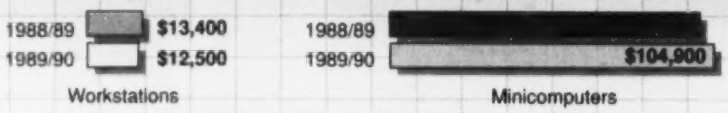
## What's Working for Workstations

**Suppliers aren't having to discount workstations as much...**

AVERAGE % BELOW LIST PRICE

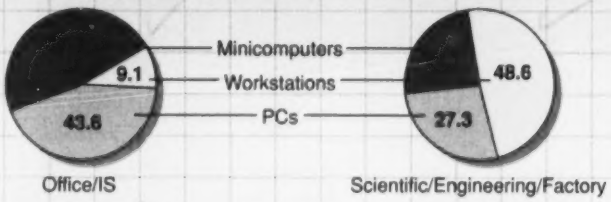
**Prices of workstations continue to fall, while those of minis rise...**

AVERAGE PRICE



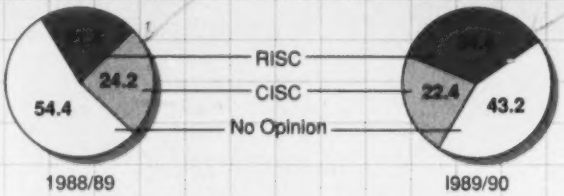

**Commerical application of workstations is beginning, as technical use of them becomes dominant...**

TYPE OF SMALL SYSTEMS FOR NEW APPLICATIONS (BY % OF MENTIONS)



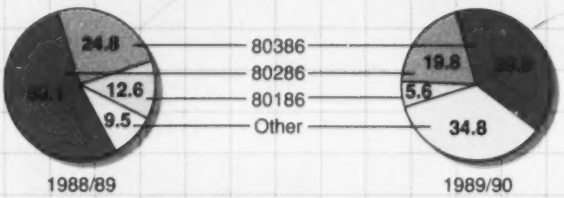

**Users and suppliers have high expectations for core technologies used in workstations–RISC processors and Intel 80386 chips...**

MOST PREVALENT ARCHITECTURES IN THE FUTURE (BY % OF MENTIONS)




RISC=Reduced Instruction Set Computing
CISC=Complex Instruction Set Computing

MOST PREVALENT INTEL CHIP USE IN THE FUTURE (BY % OF SYSTEMS SHIPPED)




**And users see a greater need for workstations in the future...**

SYSTEMS NEEDS A YEAR IN THE FUTURE (BY % OF MENTIONS)

Source: DATAMATION/Cowen & Co.

survey as they did a year ago. Still, Lotus retains 70% of that market.

Microsoft officials expect further growth in applications software, which last year accounted for 42% of the company's $803 million in sales. Microsoft is hopeful that a drop in the price of memory chips used in PCs will spur sales of OS/2, a memory-hungry operating system. Many industry observers had predicted that the demand for OS/2 would be stimulated by its Presentation Manager interface, but there's little evidence in the survey to support that belief. PM meets little user friendliness in this year's survey—only 11.5% of prospective OS/2 users intend to use the interface by the end of 1990.

**Use of graphics workstations is increasing, particularly in technical applications.**

That Presentation Manager and OS/2 are receiving the cold shoulder from users may spell trouble for the low end of IBM's System Applications Architecture (SAA) strategy. OS/2 is one of the key operating systems in the SAA world, the others being positioned in the midrange (OS/400) and the high end (MVS and VM). Lack of interest in OS/2, if it exists, may be offset in part by IBM's success in networking—a key function if it's to persuade users to develop SAA applications across a range of computer platforms. Survey results indicate that IBM has 10.2% of the local area network (LAN) market for PCs and 19.3% of the market for LANs connecting workstations and minicomputers.

IBM's growing presence in mini LANs reflects, in part, the success of its AS/400 midrange (aka minicomputer) system. The family of AS/400 products, introduced in June 1988, now accounts for three-quarters of IBM's midrange shipments to surveyed users. Moreover, the AS/400 continues to propel IBM upward in the U.S. minicomputer market. In the future, 38.5% of users surveyed say they will regard IBM as their chief minicomputer supplier—up more than five points from the 33.2% of users who currently regard Big Blue as such. The largest slice of AS/400 purchase plans continues to be made by companies with annual revenues in the $11 million to $250 million range. Interest in the midrange system among bigger companies, though, is also increasing. Nearly 15% of institutions with revenues above $250 million plan to buy an AS/400 this year or next—up from 9% in last year's survey. Surprisingly, support for the AS/400 among small companies—a class of users specifically targeted by IBM when it introduced the machine—is down to 5.7% from 6.3%.

More astounding is the lift in minicomputer/workstation shipments that IBM seems to be getting from the AS/400 and other products—System 3X, RT workstations and high-end (model 70 and 80) PS/2s. In the 12 months that began in July 1989, IBM's share of survey respondents' minicomputer/workstation purchases is expected to soar from 27.8 to 39.4%.

### The Price of Success

So who's paying the price for IBM's midrange success? Evidence in the survey points to Digital as the main victim. And right now the No. 2 computer maker's tab looks steep. Item A on that bill shows that nearly twice as many Digital customers are considering purchasing an AS/400 today than they were a year ago. But the number still remains small—only 8.6% of prospective AS/400 customers today regard Digital as their chief supplier. Item B indicates that where an AS/400 is expected to replace a previously installed non-IBM system, Digital systems are the ones getting the boot 19% of the time—up from 13.5% a year ago. Item C involves another minicomputer player, as well. Existing customers of Digital are almost as likely to buy or at least evaluate an AS/400 as are customers of troubled Wang Laboratories Inc.

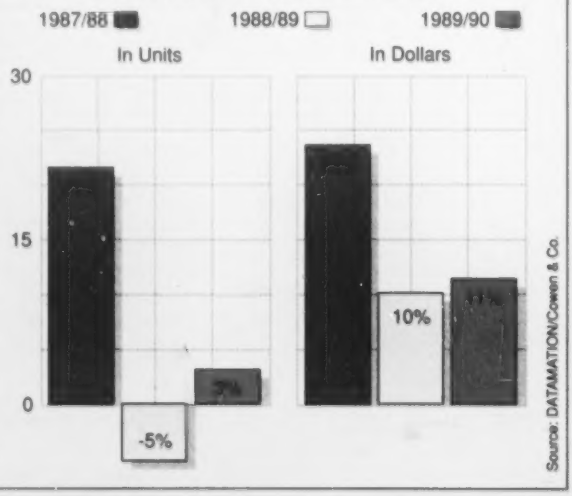
All of those items add up to market-share troubles for Digital. Although more users in the survey state that the Maynard, Mass., company will be their chief minicomputer/workstation supplier in the future (22.7% tomorrow vs. 21.4% today), these once and future Digital users plan to spend more money with its competitors between July 1989 and June 1990 than they had in the previous 12 months. Consequently, Digital's share of systems purchases is expected to decline to 31.9%, down from 40.5% a year ago.

Digital's own product line, as much as competition

## The PC Industry Returns to Health

After failing a year ago, U.S. shipments of personal computers look much stronger.

PROJECTED U.S. PC SHIPMENT GROWTH



from anyone else's, could account for the tumble. When the survey was taken, the company lacked a high-end system capable of generating big revenue gains. It also had just introduced a revamped 6000 series of minicomputers about which survey respondents probably knew very little. And the product line that users could evaluate in 1989 differs markedly from the one they saw in 1988. It contains a lot more workstations, whose prices fetch fewer dollars per system than their older minicomputer predecessors.

The survey does, however, point to some areas where Digital may be exacting a price from others. In the OLTP system market, where minicomputers and mainframe systems are used heavily, Digital's share jumps from 5.8 to 14.8%. In database software, its position improves from 7 to 7.3%. In minicomputer/workstation networks, Digital's connections rise from 12.7 to 19.3%. And in PC LANs, they go from 4.1 to 5.9%. However, in almost all of these cases, Digital is taking market share away from less-established players—not from the leaders.

### The RISC Takers: HP & Sun

Unlike Digital, which seems to be the current target of IBM's AS/400 cannon, Hewlett-Packard has moved out of IBM's range. Fewer than 3% of its customers (including those of Apollo Computer Inc., which HP purchased in April) plan to replace HP systems with AS/400s. The reason appears to be Spectrum, the line of minicomputers based on RISC technology that the Palo Alto computer maker began shipping in August 1987. The machines are capable of running a version of HP's homegrown MPE operating system and/or the company's version of UNIX. The success of the Spectrum line and the ability for HP to supply its customers with PCs seems to be rubbing off on the company's peripherals business. HP leads all others in supplying users in the survey with laser printers and 100+ megabyte hard disk drives.

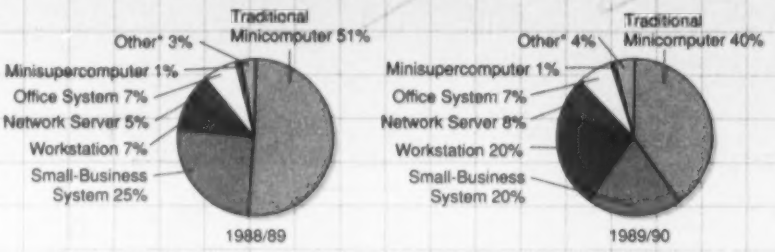
HP, however, faces the same challenge confronting Digital: how to maintain or improve the share of midrange system dollars spent by users with a product line increasingly dominated by lower priced systems—i.e., workstations. Little else can explain why increasing numbers of customers regard HP, like Digital, as their chief supplier of minicomputers and workstations, while those same customers expect to spend fewer of their dollars on future purchases of such systems.

The supplier most responsible for pushing minicomputer and workstation prices lower and lower is, itself, experiencing the same effects as HP and Digital. Sun, too, is gaining customers: 5.6% of users in the survey will consider the Mountain View, Calif. company their chief supplier in the future, up from the 4.1% of all users who worship Sun today. But in terms of dollar-based future purchases of systems, the survey indicates that Sun's market share will drop from 10.7 to 9.6%. The reason again has mostly to do with product lines. Sun has introduced an aggressively priced new family of products,

## What's Behind the Mini Slump

**Workstations and network servers are running applications formerly reserved for minicomputers...**

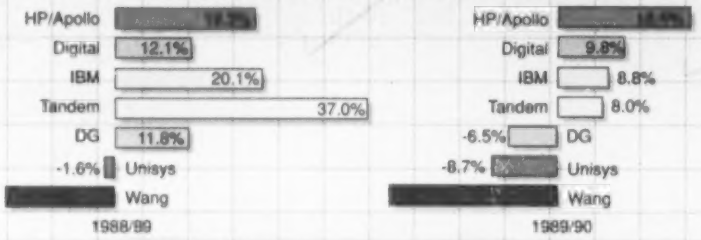
TYPE OF SYSTEM MOST RECENTLY PURCHASED




*Limited explicitly to intelligent terminals and data entry systems before the 1986 survey.

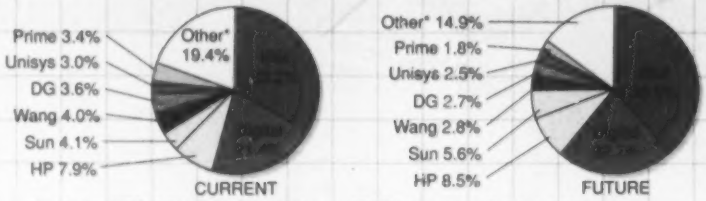
**Customers don't hold minicomputer suppliers in as high regard...**

SHIFT IN ATTITUDE TOWARD CURRENT SUPPLIER




**The number of minicomputer suppliers is shrinking...**

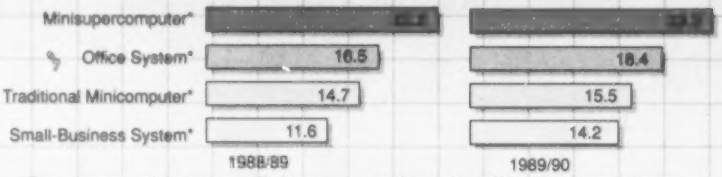
PRIMARY MINICOMPUTER/WORKSTATION SUPPLIER (BY % OF MENTIONS)




*Includes NCR 2.8% current/2.4% future, AT&T 1.1%/1.4%, Tandem 0.7%/0.8%, Bull 1.4%/0.6%, etc.

**Minicomputer suppliers are discounting their products more aggressively...**

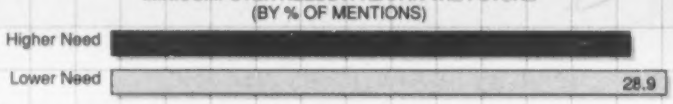
AVERAGE % BELOW LIST PRICE




*Based on type of system specified as most recently purchased by survey respondents.

**And users don't see as great a need for minicomputers in the future.**

MINICOMPUTER NEEDS A YEAR IN THE FUTURE (BY % OF MENTIONS)




Source: DATAMATION/Cowen & Co.

Data General will be squeezed next year as minicomputer sales fall.

SPARCstations, that's eating into demand for its higher priced workstations.

There are, indeed, clouds for Sun in this year's survey. Loyalty among Sun customers remains below industry average—somewhat of a surprise given the price/performance benefits delivered by the workstation maker. Data General Corp. and Unisys also get lower marks from their customers. Another cloud is Digital, which is the closest runner-up to Sun at customer sites where Sun wins orders. The competition between Sun and Digital should be even tighter now that Digital is offering a RISC product line.

Looking on the bright side for Sun, it seems well positioned in a number of high-growth areas and applications. On the commercial side of IS, for instance, Sun has a growing following. Nearly one out of four Sun users in the survey employs Sun's workstations in office or IS applications—small in comparison with those using its machines for technical applications, but substantial just the same. Sun also gets the highest grades of any supplier for LAN server applications, a key component in the evolving world of distributed processing. Most telling, perhaps, is the fact that customers in the survey buy Sun systems for all of the reasons experts believe will right the worldwide computer industry on its course in the 1990s: processor performance (RISC), networking capabilities and strong UNIX standards.

Sun, of course, isn't alone in building products around such features. Almost all of the traditional minicomputer manufacturers are doing the same. Data General and Unisys, in particular, are empha-

## PC Software: The Added Dimension

Although personal computers are charging headlong into a new dimension of corporate computing, it's not certain whether software applications can give PCs the push they'll soon need to sustain such momentum. The latest and greatest software products for 80386-based machines are coming to market in agonizingly slow fashion—in part because users see few, if any, new applications for them on the horizon.

Participants in this year's survey of PC, workstation and minicomputer users conducted annually by DATAMATION and Cowen & Co. indicate that the status quo among suppliers will reign in practically all leading categories of desktop applications software. That's especially true in the spreadsheet, word-processing and desktop-publishing worlds.

Today, word processing remains far and away the leading application of PCs. Spreadsheet software and database management systems (DBMSs) packages follow in popularity. Tomorrow, users see DBMS applications as having the greatest potential for fueling the PC industry's growth. But their vision is hardly focused. Only a fourth of users surveyed view DBMSs as the tiger PC users need in their desktop tanks.

Here's the way individual segments look from the survey.

**Spreadsheets.** Lotus Development Corp.'s dominance is slipping very slightly, as its 1-2-3 product continues to command 70% share of the market. What little ground the Cambridge, Mass., software producer is yielding, Microsoft Corp. seems to be gaining. Its Excel and Multiplan packages give the Redmond, Wash., software maker 14% of the spreadsheet market. Computer Associates Inc.'s SuperCalc and Borland International Inc.'s Quattro products, meanwhile, each continue to capture 4% of spreadsheet use among survey respondents. Note, however, that respondents replied to this year's Mini/Micro survey before Lotus began shipping 1-2-3 releases 2.2 and 3.0 and prior to Borland's Quattro Pro 2.0 upgrade.

**Word Processing.** WordPerfect Corp. of Orem, Utah, will tighten its stranglehold as the top supplier of word-processing software to users in this year's survey. Nearly half (47%) of all users intend to use WordPerfect for their word processing in the future—up from 30% two years ago. Microsoft will hang onto second place, capturing 14% share with its Microsoft Word product for IBM PCs, PC-compatibles and Macintosh systems. In contrast, WordStar and MultiMate—word-processing packages from MicroPro International Corp. and Ashton-Tate Corp., respectively—fade slightly in importance this year.

**Database.** Ashton-Tate's real test is in its homegrown market—database management software. Although the Torrance, Calif., company dominates the field with 48% of all users identifying its dBase product as their chief DBMS package, its share is slipping. Gaining ground are Borland International, whose Paradox and Reflex products climb from 6 to 8% in the DBMS category, and Belmont, Calif.-based Oracle Corp., whose share jumps from 3 to 6%. The only steady member of the DBMS fraternity is Microrim, whose R:Base product again captures 7%.

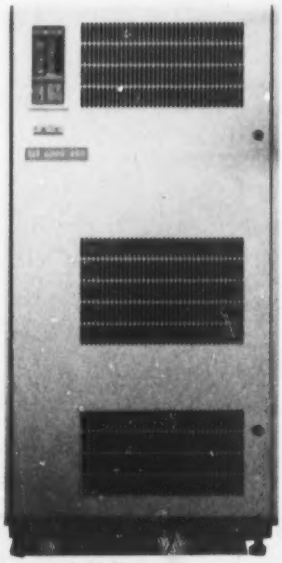
**Desktop Publishing.** Aldus Corp.'s PageMaker software and Xerox Corp.'s Ventura publishing packages will keep their lock on the market. PageMaker's grip actually will tighten slightly, going from 40 to 42%, while Xerox's will claim 33% of the market for desktop publishing software for the second year in a row. Behind those leaders, Software Publishing Corp.'s PFS:First Publisher's share will be halved to 3% in 1989.

**Computer-Aided Design/Engineering.** Autodesk Inc.'s AutoCad package wins hands down as the most used computer-aided design/engineering (CAD/CAE) software for PCs, with 61% of respondents saying they will use AutoCad in the future. That's up nearly 10 points from two years ago. No other CAD/CAE product will claim more than a 3% share next year.

**Computer-Aided Software Engineering.** The tools Oracle is providing with its general purpose database products are having a ripple effect in the PC market for computer-aided software engineering (CASE) products. Oracle's share of this market jumps from 3 to 8% when users identify which CASE product they're now using and what they'll employ in the future. Market leader Index Technology Corp., which produces Excelerator, cedes some turf to No. 2 KnowledgeWare Inc.

*—John McMullen*

sizing the performance of their open product lines. Whether the rush to RISC, UNIX and networking standards will shore up the sagging market share of such companies remains to be seen. They, like other traditional minicomputer suppliers Prime Computer Inc. and Wang, are falling further behind leaders IBM, DEC, HP and Sun in this year's survey. More disconcerting for such lagging suppliers is that more minicomputer/workstation users in this year's survey contemplate switching chief suppliers than in the previous four surveys.



**DEC recently recharged its Vax 6000 line.**

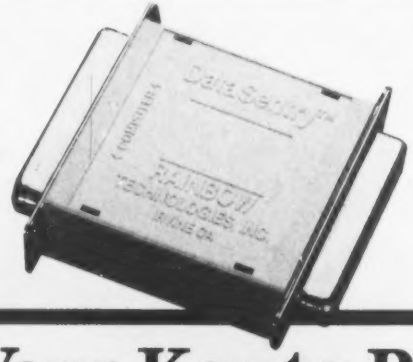
### New Styles for New Times

The biggest shift evident among minicomputer users in this year's survey isn't, however, from one supplier to another. It's from one style of computing to another. The traditional proprietary operating systems running on complex instruction set computing architectures are giving way to the open world that AT&T, HP and Sun are making so much noise about. It's an era where users harness the power of RISC technology and the availability of applications software written to a standard (UNIX). And it appears to be an era quickly dawning for users in this year's survey.

One out of five user organizations in the survey intends to make UNIX its primary operating system for commercial applications in the future; two out of five technical users have such intentions. Both figures are up sharply from last year's survey, although users seem hardly more knowledgeable about which version of UNIX they'll bet their IS shops on. Nearly half of all users in this year's survey say they don't know whether UNIX International Inc.'s version of the operating system will win out over the Open Software Foundation's UNIX model. Among the remaining half of survey respondents, however, UNIX International has pulled decidedly ahead of OSF as the odds-on favorite to win the UNIX battle.

RISC, meanwhile, seems to be victorious over complex instruction set computing (CISC) in the contest for systems architectures. Almost a third of all users see reducing the number of instructions needed to make a processor work as the way to go in minicomputers; barely a sixth of them thought so a year ago. And workstation users pledge even greater allegiance to RISC.

What RISC, UNIX and the multitude of other changes afoot in this year's survey imply for IS managers is that the purchasing decisions made today will have a broad impact on their organizations—immediately and down the road. A misstep into the new dimension of desktop computing could be costly. No step into it all, however, could be far more expensive.



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Circle 17 on Reader Card

# A Wary Reception To New PC Bus?

Few technical differences separate EISA and Micro Channel computers. But some users are choosing MCA, because it has more add-on boards and peripheral support.

BY BOB FRANCIS

Five years ago, Kaiser Aluminum and Chemical Corp. was a Big Blue shop from the top of its 3081 mainframe to the bottom of its shiny new PCs.

That exclusivity ended when Kaiser's Spokane, Wash.-based information center discovered PC clones. First-generation IBM PC XTs and ATs gave way to 80286-based PCs from companies such as AST Research Inc. of Irvine, Calif., and Dell Computer Corp. of Austin, Texas.

But, with its latest purchases, the company is coming full circle. After several years of relying on clone makers for its PCs, Kaiser is returning to the IBM fold.

One reason IBM is back in good standing at Kaiser is the Micro Channel Architecture (MCA). "We've purchased 16 IBM [PS/2] model 70s, and we're looking at these as the next platform for our implementation of future PC technology," says Norris Brown, Kaiser's workstation manager. Kaiser considers the PS/2's 32-bit input/output MCA bus to be a key element of its desktop future. The speed and advanced technology of the bus—which delivers 32-bit chunks of data to the central processor where previous buses could only transfer data in 16-bit chunks— is also delivering PC clone users to IBM like so many prodigal sons.

"I think IBM did [its] homework," says Brown. The PS/2 and its MCA bus are being received so well that Brown sees their place assured in his company's computing future. "At some point, we'll move to OS/2, and then we'll need to take advantage of the 32-bit capabilities of these machines," he comments.

That's bad news for MCA rival EISA—the Extended Industry Standard Architecture. This rival 32-bit input/output bus is soon to be available in computers from Compaq Computer Corp. of Houston and a consortium of eight other PC makers. The arrival of the EISA bus could be just in the nick of time. According to the 1989 fall DATAMATION/Cowen & Co. survey of U.S. DATAMATION readers' PC purchasing intentions, nearly twice as many PC buyers chose MCA over EISA when asked to name the PC bus architecture likely to prevail in the future. However, there is still a large undecided group, which may give EISA a chance to prove itself. Furthermore, there is still strong support for the AT bus—the 16-bit bus associated with the prior generation PC ATs and compatibles.

**SETTING THE MOLD:** Kaiser Aluminum & Chemical is turning to the MCA PS/2 model 70 for its future desktop systems.

EISA was conceived as a result of IBM's decision to change buses with its PS/2 family, replacing the AT bus with a new bus, the MCA. Both IBM and the makers of the AT-compatible machines used the AT buses. However, the MCA bus does not allow PC AT add-in products to be used on the PS/2, making the PS/2s incompatible with the earlier generation PCs. Furthermore, unacceptably high MCA license fees prompted PC clone makers to break with IBM over the new bus and begin work on their own 32-bit bus, EISA, which would be AT- compatible.

As most indications show, the break has been something of a tempest in a teapot. The majority of existing PC applications haven't required either bus. And EISA systems have been unavailable for direct comparisons. As a result, most of the industry's attention has been on the vendors' split.

But the debate may soon

take on greater import. As PCs become connected via local area networks (LANs), 32-bit data paths and fast transfer rates become more necessary for the smooth operation of the PC LANs, says Chris Skeadas, senior vice president for communications at the Bank of America (BoA), headquartered in San Francisco.

### Two Peas in a Pod

Functionally, the two buses are nearly identical. Both deliver data from memory or peripherals to the processor along a 32-bit data path and support data transfer speeds that are much faster than was possible in earlier PCs. Both also support bus masters, ways of distributing work among specialized processors. Bus masters improve overall system performance by handling jobs that otherwise would occupy the main processor. For instance, specific applications may be assigned to bus masters on a network server, freeing up the main processor for communications tasks.

So far, few such specialized processors actually exist, and even fewer applications can take advantage of those that do exist. Yet, many believe the development of PC-based corporate systems predicated on such technologies as multitasking, micro-to-mainframe links, graphics-intensive video or digitized voice capabilities will eventually create a need for bus masters.

But which 32-bit bus users choose when EISA becomes available may rest more on their willingness to depart from AT bus compatibility than on any technical characteristics of MCA or EISA. "[The differences] are going to be something we take into consideration, but with very important applications you're going to do it [move to a 32-bit bus anyway] whether it is a MCA machine or something else," BoA's Skeadas says. Whether to move to the potent 32-bit architectures of IBM's MCA and EISA is a "no brainer," agrees Mark Cuban, president of MicroSolutions Inc., a Dallas personal computer reseller.

**□ THE SPEED OF THE BUS IS DELIVERING CLONE USERS TO IBM LIKE SO MANY PRODIGAL SONS.**

"When you see an MCA machine operating in a stand-alone environment, it's not that different from an AT machine, but in a network application it [having a 32-bit bus] makes a big, big difference," says Cuban. "I imagine an EISA machine will offer the same advantages [as the MCA machines]," he says.

"We had to go to a 32-bit architecture, there's no doubt about that," confirms James Hoisington, a Dallas area computer consultant. "The question is which system will corporations buy into, MCA or EISA?"

### The Score on MCA

So far, IBM's MCA has enjoyed a 29-month solo run. And the results speak glowingly for it, according to Dataquest Inc., a San Jose market research firm. IBM will have an installed base of 2 million MCA machines by the end of this year. And IBM has compiled a list of some 1,000 add-in boards for MCA systems that are either currently available or will be shortly.

EISA advocates do not quarrel with these numbers, but they do question their importance. They consider the number of add-in boards a moot point. "Most of those [boards] do not take advantage of the 32-bit operating system, [and] are simply MCA versions of AT add-in cards," says Kevin Mankim, director of product development at EISA supporter Zenith Data Systems Corp.

EISA supporters hope to blunt MCA's 29-month lead by making EISA specifications available earlier than EISA chips, reducing the time for third-party manufacturers to deliver add-in-cards. In addition, several members of the EISA consortium will be likely to offer some EISA peripherals to smooth its market entry. For instance, Compaq is committed to making a 32-bit hard disk controller available with its first EISA system. And Zenith and Hewlett-Packard Co. hint that they are willing to do the same.

Some users, like Brian Livingston, data center manager for Reliance National Insurance Co. in New York City, don't think microcomputer managers should have to deny themselves the choice of different machines and different technologies. As executive director of the 486 Standardization Committee, Livingston wants corporate PC purchasers to have a choice. With standards, one can have a choice without being penalized for their decisions, he argues. "We [microcomputer managers] are all out examining the next platforms we need for the next generation of computing, and we want to have a choice and we want standards. We think we should be able to have both," he says.

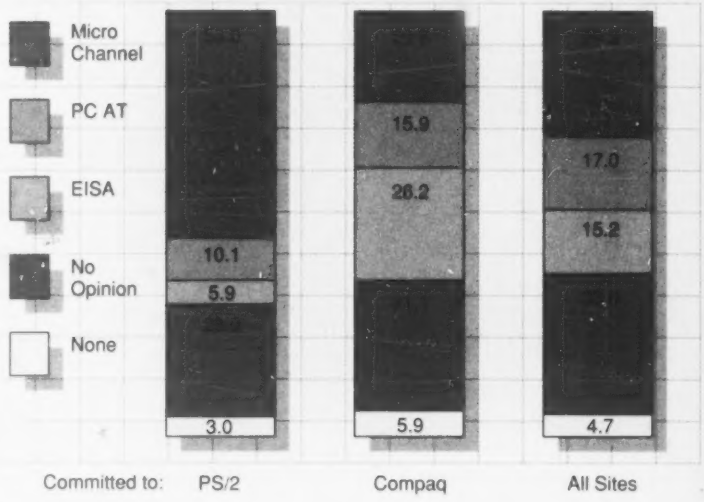
### Picking What's Available Today

Other users, such as those at Kaiser Aluminum and the Bank of America, are picking what's available today. And that means MCA. BoA recently based a new customer on-line information system on the MCA PS/2 model 55SX. "We needed a foundation for growth because we know new technologies will be coming in the future, and we know we'll need a power PC with 32-bit operating capability," says Skeadas. "From our perspective, the business applications of the PS/2 product line made sense to provide that foundation, and MCA was a part of that," he explains. MCA lends itself to the bank's

## EISA Remains in the Running

Strong support for the AT bus and a large undecided population cloud the outlook for PC bus dominance. Overall, EISA preference trails that of Micro Channel and AT.

**% OF RESPONDENTS SPECIFIYING WHICH BUS WILL DOMINATE**




Source: DATAMATION/Cowen & Co. 1989 Survey.

plans to eventually add advanced technologies such as image processing to its PC network.

At Kaiser, Brown says he expects the MCA PS/2 model 70 to meet his company's future needs, but he plans to keep his options open. "They've built a good machine, but they're going to have to earn their keep. I'm sure there'll be alternatives in the future if they don't measure up," he says.

It's that willingness to consider alternatives that keeps hopes for EISA alive. EISA offers choices in product and vendor selection, says Francisco Albuquerque, PC product marketing director at AT&T in Bridgewater, N.J. "Users want a choice of vendors; they've made that clear," Albuquerque states. Although AT&T is not a member of the EISA consortium, it has endorsed EISA.

The telecommunications giant, which currently sells AT-compatible PCs manufactured by Olivetti and Intel Corp., also will supply MCA-compatible machines if demand appears. "We've stated that we believe EISA is the way to go for 32-bit architectures. At the PC level, buyers have simply not gone with one vendor, and I don't believe you're going to see them move from a multivendor environment to a single-vendor environment when there is simply no real advantage from a technical point of view. The choice, though, is up to the customer," says Albuquerque.

However, a choice of system vendors

**☐ WE WANT TO HAVE A CHOICE, AND WE WANT STANDARDS. WE THINK WE SHOULD HAVE BOTH.**

is by no means an exclusive feature of EISA. Vendors currently supporting or promising MCA systems include Dell, NCR Corp., Olivetti, Tandy Corp. and Wang Laboratories Inc. IBM is another vendor expected to make MCA part of its newest PC family of workstations based on reduced instruction set computing (RISC) technology.

Yet, significant sales of MCA technology so far have been limited to IBM's PS/2 family. For instance, Fort Worth, Texas-based Tandy says interest in its 80386 MCA-compatible PCs has been lax.

"We just haven't seen the interest we thought we would [be seeing] if people were really interested in the Micro Channel," says Tandy director of market planning Edward Juge. Tandy will continue to sell the machine even though the company is one of the original EISA founders and plans to sell EISA PCs as well.

Dell, which announced an MCA-compatible machine in April 1988 but has yet to ship any, is another vendor that sees no demand for alternate MCA machines. "The interest simply wasn't there. If there is, we'll ship it, but right now we don't see it," says a Dell spokesman.

### Retailers Impartial

That lack of interest was one reason Tandy was more than happy to join the consortium supporting EISA. The eight original members of the consortium are: AST, Compaq, Epson America Inc., Hewlett-Packard, NEC Information System Inc., Olivetti, Wyse Technology and Zenith Data Systems. Since that time almost 200 vendors have expressed interest in producing EISA related products.

Caught in the middle of these factions are the retailers and resellers who supply most of the corporate world with PCs. Pleasanton, Calif.-based ComputerLand Corp. makes information about both 32-bit bus architectures available to its customers. "For the moment, Micro Channel machines are our biggest sellers, but we're constantly being asked to help our customers decide whether they need a better bus," says director of product marketing, William Graves. "So when EISA-based machines are available, we'll be helping them make that choice" by selling PCs of either stripe.

Businessland Inc.'s vice president of national accounts Frederick Snow says that MCA and EISA interest prompted the retailer to train its sales force to handle questions on each. "We don't make the decision for our customers, but we have to offer them a fair evaluation of the technological choices available, even if the technology is not represented by the vendors we represent," he says.

Yet, for all the squabbling today, MCA versus EISA may not be a lasting issue except in IS history books. Says consultant Hoisington: "I remember when we had a raging debate about whether to have square holes or round holes in the old punch card machines. Who talks about that now?" ▭

## A Striking Similarity

Wondering about the technical differences between Micro Channel Architecture and Extended Industry Standard Architecture? There are surprisingly few of them.

MCA and EISA support equivalent bus masters features, high-speed data transfers and impressive numbers of card slots. All are important to distributed-processing or cooperative-processing environments, says ComputerLand Corp. director of product marketing William Graves.

It's no wonder, then, that the similarities between these bus architectures are more striking than their differences. Both buses support a maximum of 15 bus masters. These are specialized processor cards that improve overall performance by taking on tasks that otherwise would be performed by the main processor.

At present, there are fewer than 20 bus master boards available for MCA machines. So far, there is only one bus master promised for EISA, although the EISA consortium includes a smattering of board makers. Proteon Inc. in Westborough, Mass., pledges to have a token ring adapter board for EISA bus systems when the systems are shipped later this year.

The differences in other areas are also minor. EISA and MCA both transfer data in so-called burst mode. That means some data can bypass the central processor and move from random access memory to 32-bit peripherals and vice versa at speeds much faster than today's AT computers operate at. EISA specifies a whopping 33 megabits per second and MCA a 20Mbps transfer speed.

Finally a difference between the two systems, you say? Hold that thought while it still feels good. "Users won't be able to tell the difference between machines with a 20Mbps transfer rate and a 33Mbps transfer rate," says Tandy director of market planning Edward Juge.

Another difference between the two standards is the number of slots available for add-in boards. MCA offers eight, EISA 16. A tangible difference? Not hardly. Both are ample for today's needs and probably for some time to come, since so many communications ports are built into all types of PCs, says EISA supporter Bob Puette, general manager of Hewlett-Packard Co.'s Personal Computer Group. Puette says future applications could require several bus master boards, but admits IBM could adapt MCA to allow for more slots.

But, with an ample drum roll, comes a difference that users can have now—a difference that users now can get with MCA and with EISA once the machines are released—self configuring add-in boards. Yes, that's right: neither dip switches nor jumpers would be set, as with existing boards. That difference won't exactly set the world of corporate computing free to solve other more pressing problems, but at least it's something you can count on.

# How Are Your Vendors Doing?

IS vendors are finding that they are not immune from the general economic slowdown. However, their fortunes are expected to rise with the general economy as well, in 1991.

BY MADELINE FRANCHI

Information systems vendors got a strong taste of the general economic slowdown in the United States this past summer. In particular, U.S. computer and peripherals manufacturers watched their new orders drop like rocks as domestic demand for their products continued to weaken and international sales growth softened, too.

With the 12 months ending in July 1989, new orders for information systems (which include all computers, office equipment and commercial communications equipment) totaled $108.3 billion. Although this represents a 4.5% increase from the prior 12-month period, it compares poorly with the 9% rise enjoyed in the previous year. Furthermore, the bookings for new orders in July 1989, at $9.1 billion, were 3% lower than they were in July 1988. Such a steep year-to-year decline hasn't been seen since February 1987.

The computer and office equipment manufacturers really took it on the chin. New orders for their equipment sagged 3.2% from June to July and a whopping 8.2% from July of last year. Shipments, which had been relatively strong despite waning growth in new orders over the last year, were curtailed sharply, too. From June to July, shipments fell 7%, a decline of 0.3% from July 1988.

The computer industry could get into a real bind if the economic contraction in the general U.S. economy goes deeper or runs longer than is currently expected. According to U.S. Commerce Department data, billings for orders already shipped have been outpacing bookings for new orders for the industry as a whole since 1984. That means backlogs, those orders waiting to be filled, have been dwindling.

As of the end of July, unfilled orders for the computer industry amounted to $11.8 billion. That value is the lowest since April 1978 and represents only two times the amount of monthly shipments at their current level. Other electronic equipment sectors, for example, instruments and communications equipment, have backlogs of around three times their monthly shipments' volume. So, the computer manufacturers' backlogs are low not only by historical standards but also relative to other segments of the electronics industry.

This situation means the computer and office equipment makers don't enjoy a large buffer of orders to help keep production humming as they wait for growth in new orders. So, in the near term, we could see more headlines citing industry hiring freezes and layoffs. As of July, employment in the computer sector averaged 477.9 thousand persons, just about the same as last year at that time, but down almost 7% since 1984.

What do the next 18 months look like for U.S. information systems companies? Cahners Economics expects shipments of IS equipment to total $112.3 billion by the end of this year—a 4.7% gain from 1988. Growth in shipments is expected to slow to only 1.4% by the end of 1990 before picking up considerable steam again as the general economy improves and business investment picks up in 1991.

*More economic information can be obtained from Cahners Economics Department, 275 Washington St., Newton, MA 02158, (617)-964-3030.*